

## REMARKS

Applicants submit the following remarks in support of the patentability of the presently claimed invention over the disclosures of the references relied upon by the Examiner in rejecting the claims. Further and favorable reconsideration is respectfully requested in view of these remarks.

Initially, as required by the Examiner, an Abstract of the Disclosure is submitted herewith on a separate sheet. The Abstract is essentially taken from the Abstract of the published International application, except that the reference numerals in parentheses for the drawing have been omitted, since they are considered to be unnecessary for an Abstract.

The rejection of claims 16-23 under 35 U.S.C. §102(b) as being anticipated by EP 0 659 469 is respectfully traversed.

The present invention, as claimed, is directed to a membrane structure comprising a tubular porous ceramic monolith support which has an average pore size of 1 to 20 microns having at least four tubular conduits formed within the monolith with a zeolite membrane formed on the internal surface of the conduits, the zeolite membrane having an internal diameter of 5 to 9 millimeters and the ceramic monolith having an outer diameter of 20 to 25 millimeters (claims 16 and 20).

The EP '469 reference discloses a membrane for liquid mixture separation composed of a porous support and A-type zeolite deposited thereon. The reference indicates that the porous support should be in the form of a pipe, 20-100 cm long, about 10 mm in outside diameter, and 0.2 mm to several mm in thickness, or in the form of a cylinder, 20-100 cm long, 30-100 mm in outside diameter, and 0.2 mm to several mm in thickness, having a plurality of holes, 2-12 mm in inside diameters, arranged parallel in the axial direction (page 3, lines 3-7).

The Examiner states that the reference discloses a tubular monolith membrane having a plurality of conduits, zeolites formed inside, ID 2-12 mm, and OD 10-100 mm. With regard to the OD 10-100 mm, the Examiner appears to have taken the outside diameter of the pipe (10 mm), and combined it with the upper limit of the range (30-100 mm) for the outer diameter of the cylinder. However, the embodiment of the porous support having a plurality of holes is for the cylinder, not the pipe. The pipe has an outside diameter of about 10 mm. This would make it impossible for the pipe to have a plurality of holes each of which has an inside diameter of 2-12 mm. Accordingly, for

the cylinder embodiment, which the embodiment with a plurality of holes, the outside diameter of the cylinder is 30-100 mm. This certainly does not anticipate the presently claimed membrane structure wherein the tubular porous ceramic monolith support has an outer diameter of 20-25 millimeters, the upper limit of this range being well below the lower limit of 30 mm for the outside diameter of the cylinder in the reference.

The dimensions referred to in claim 16 are chosen specifically to improve the performance of the membrane structure, and as indicated above, membrane structures with these dimensions are not described in the EP '469 reference. Different conflicting criteria were taken into account when selecting the dimensions of the presently claimed membrane structure, and it is apparent from the experimental results set forth in the present specification that such membrane structures with the claimed dimensions provide improved results.

For these reasons, Applicants take the position that the presently claimed invention is not anticipated by the EP '469 reference, and is patentable over this reference.

The rejection of claim 24 under 35 U.S.C. §103(a) as being unpatentable over EP '469 in view of WO 93/19840, as well as the rejection of claims 25 and 26 under 35 U.S.C. §103(a) as being unpatentable over EP '469 in view of WO 97/18886, are respectfully traversed.

The comments set forth above concerning the EP '469 reference are considered to be equally applicable to each of these rejections.


The Examiner applies each of the secondary references for their teaching of subject matter set forth in three of the dependent claims of the present application, which are directly or indirectly dependent on independent claim 20. Claim 20 has the limitations concerning the membrane structure as set forth in the discussion above. The secondary references fail to cure the shortcomings of the EP '469 reference, as noted above, in failing to disclose the particular dimensions required for the presently claimed membrane structure. Therefore, even if the secondary references were combined with EP '469 in the manner suggested by the Examiner, the result of such combination would still not suggest the presently claimed invention.

Accordingly, Applicants take the position that the rejections set forth by the Examiner should be withdrawn.

Therefore, in view of the foregoing amendment and remarks, it is submitted that the present application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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